RESEARCH PAPER

Customer Segments Among Family Forest Owners: Combining Ownership Objectives and Decision-Making Styles

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Abstract Empirical forest owner classifications typically distinguish groups based on owners' behaviour or motivations. Typologies are used to inform forest and environmental policies and market-based service provision. However, single typologies may be weak in discerning owner groups that would bring new insights for policymakers or service providers. The present study aims to put together two previously documented owner classification frameworks to form and analyse customer segments for decision-support services. The first grouping is based on owners' objectives for forest ownership, while the second grouping focuses on owners' decision-making styles. These two typologies deal with subjects of interest and motivations for communication, respectively. The study uses a subsample of the Finnish Forest Owner 2010 survey data, collected in 2009 (n = 2,106). Via cross-tabulation of the two groupings, the four largest and potentially most interesting combined owner groups are discerned: multiobjective learners (13 %), multiobjective thinkers (9 %), learning recreationists (8 %) and learning investors (7 %), while the other 16 combined groups each account for less than 6 % of owners. The result thus reveals the need for learning-oriented services for three differing principal subjects of interest as well as multiobjective services for deliberate thinkers, i.e. comparative information about forest management alternatives. The message for policymakers and service providers is that the majority of forest owners may be served with educative interactive services. Learning-oriented indifferent owners need special services to recognize their latent goals. Delegators need ready-made

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services for outsourced decision making and self-reliant owners need information packages of varying contents. Combinations of groups prove feasible for producing policy advice.

Keywords Customer value · Family forest owners · Finland · Landowner survey · Multivariate statistics · Typologies

Introduction

The development of extension services for family forest owners requires knowledge about the owners, their various motives and their customer values. A vast number of studies have focused on owner demographics and holding characteristics, attitude or objective typologies, lifestyles or behaviour (e.g. Marty et al. 1988; Lönnstedt 1997; von Mutz et al. 2002; Butler and Leatherberry 2004; Ingemarson et al. 2006; Butler 2008; Majumdar et al. 2008; Novais and Canadas 2010). Survey studies suggest (e.g. Kurtz and Lewis 1981) that information delivery or communication services can be modified to fit the needs of discerned customer segments.

Framing orientations to construct forest owner groupings are manifold. In some cases, owner typologies are based on the theoretical modelling and sequential qualitative analysis of explorative research interviews (Hugosson and Ingemarson 2004) or the other way around (Hujala et al. 2007a). Some typologies are grounded on philosophical value orientations (Karppinen 1998), while others focus on owners' motivations and behaviour on a more practical level (Kendra and Hull 2005). In some cases, there has been an external driver that has motivated the authors to align their approach; for example, improving communication between owners and authorities (Boon et al. 2004), entrepreneurship and landowner objectives (Ní Dhubháin et al. 2007), or diversifying communication strategies (Salmon et al. 2006).

Some owner typologies are constructed around some specifically interesting sociological features among owners, such as "new" owners (Hogl et al. 2005) or "non-agricultural" or urban owners (Kvarda 2004), and some groupings recognize passive owners (Kline et al. 2000) or "indifferent" owners with a low level of motivation regarding their forest (Wiersum et al. 2005; Favada et al. 2009). A more comprehensive assessment of various owner typologies can be found in related review articles (e.g. Karppinen 2004; Emtage et al. 2007); the examples above illustrate that owner-profiling strategies vary according to the purpose and topical interests of the authors and their contextual audiences. Although some typologies are used in the longitudinal monitoring of change over time (e.g. Karppinen and Hänninen 2006), the majority are used only once for a particular purpose with little or no direct connection to other parallel segmentations (see Karppinen 2004).

A perusal of several typologies at the same time could give more insights into forest owners' motivations and behaviours. Analytical comparisons of landowner studies have already identified some analogies in owner classifications, such as orientations towards production, protection and consumption (Ní Dhubháin et al. 2007; Urquhart and Courtney 2011). To move forward and devise more practical

suggestions for policy and services, empirical comparative enquiries are needed. However, the combination of "single-purpose" typologies, e.g. by cross-examining two different classifications, is often impossible due to cultural reasons (different terminology and varying meanings behind the same words in different countries) or at least highly difficult in practice. Typologies are based on different empirical studies and hence different samples of forest owners. Including more than one typology question set in the same questionnaire would in turn increase the effort from the respondents and potentially increase the non-response rate and the number of missing answers. In some cases, the merging of different samples could be possible. This entails both data including very similar variables, which have been collected in the same area and within a short interval. In addition to this, data imputations would probably be needed. The missing information on an assignment to the group in question could be forecast with regression-based models utilizing responses for the other items of the same typology or owner demographics.

In rare cases, several typologies based on the same data have been identified. In the present study, the aim is to combine two typologies, one based on the ownership objectives of family forest owners and the other based on decision-making styles. These two typologies deal with subjects of interest and motivations for communication, respectively. The ownership-objective typology was first introduced by Karppinen (1992, 1998), used in the timber supply analysis by Kuuluvainen et al. (1996) and presented in an improved form by Favada et al. (2009). Recently, a similar typology was reformed with fresh Finnish data (Leppänen 2010; Hänninen et al. 2011). The decision-making style typology, in turn, was developed in a mixed-method research process (see Hujala et al. 2007b), comprising qualitative interviews (Hujala et al. 2007a) and a postal survey (Hujala et al. 2009), followed by an improved version with fresh Finnish data (Kurttila et al. 2010).

The driver for bringing these groupings together was the motivation to improve the customer segmentation of publicly funded and market-based decision-support services targeted to forest owners. Following Hujala and Tikkanen (2008), who stated that owners' objectives are not necessarily informative about their communication preferences, the principal idea was that neither owners' objectives nor their decision-making styles alone sufficiently inform service providers: both are needed and the combination matters (see also Butler et al. 2007).

Thus, a new kind of combination of groupings conjoins the content and tone in the provision of decision-support services. The "content" is derived from the typology based on ownership objectives, while the "tone" is derived from the typology based on owners' decision-making styles, i.e. communication motives. The analysis is especially motivated by the presently ongoing development of market-based holding-level forest planning in Finland, but the main idea behind joining owners' values and objectives with their decision-making method is also applicable in other types of services targeted to landowners.

The above reviewed research on landowners' motivation patterns suggests that logical links between owners' objectives and their decision-making strategy may exist. For example, if the landowner has several concurrent interests, a new kind of decision-making situation may strengthen the desire to learn, and if his/her

livelihood is threatened, the owner may want to take more responsibility for forestry decision-making. Therefore, besides reporting the respective owner group distributions and those of their combinations through fresh Finnish data, the analysis will test the following initial hypotheses: (i) most multiobjective owners and recreationists show mainly learning motives; (ii) investors and self-employed owners usually show either self-reliant or deliberate motives; and (iii) most indifferent forest owners show delegating motives. In particular, the largest combined groups are assessed by owner and holding characteristics using tabular data with statistical tests. The results are discussed from the viewpoint of providing targeted decision-support services for the combined groups discerned.

Data and Methods

Acquisition of Survey Data

The data were collected in 2009 within the Finnish Forest Owner 2010 survey (for more details, see Leppänen 2010; Hänninen et al. 2011). The population was defined as the set of individually or family-owned forest holdings with >5 hectares of productive forestland in continental Finland (N ∼ 320,000 holdings). Among these, a sample of 1,000 forest holdings was selected from each of 13 administrative forestry regions (Forestry Centre units) using systematic sampling in which the holdings were ordered from smallest to largest by forest area for each region and the sample interval varied according to the total number of holdings within each region. From the whole country, every twenty-fourth holding was chosen.

The survey questionnaire was compiled, tested and administered following de Vaus (1996) and Dillman (2000) as well as using past experiences from national forest owner surveys in Finland (Karppinen and Hänninen 2006). The questionnaire included a common part and three varying parts, which were distributed evenly (4,333 each) among the sample. This study uses the subsample for forest planning, which includes, among other questions, two distinct statement sets, the first relating to owners' objectives for forest ownership (see Favada et al. 2009; Leppänen 2010) and the second relating to their decision-making modes (see Hujala et al. 2009; Kurttila et al. 2010).

The questionnaire was distributed in February 2009, followed by a reminder card after a week and a new questionnaire 3 weeks later for non-responding owners. The number of valid responses in the subsample was 2,106 (6,318 in the whole survey), and the response rate for the subsample was thus 49.2 %.

Non-response to the whole survey was analysed by comparing the basic characteristics of the respondents with the statistics provided by the Finnish Tax Administration and conducting a total of 201 non-response phone interviews. The analysis revealed that farmers were under-represented in the data. Thus, case weights were applied taking into account the bias in the area of arable land and place of residence and also correcting the regional representativeness. As a result, the final data represent Finnish family forest holdings adequately.

Table 1 Grouping based on ownership's objectives; k-means clustering (n = 1,685)

Group	Weighted %	Mean of factor score (standard deviation)		
		Non-timber benefits	Economic security	Self-employment opportunities
I Multiobjective owners	31	0.502 (0.531)	0.716 (0.512)	0.532 (0.562)
II Recreationists	22	0.853 (0.481)	−0.712 (0.710)	−0.416 (0.556)
III Investors	18	−0.702 (0.747)	0.728 (0.491)	−0.632 (0.745)
IV Self-employed owners	17	−0.521 (0.620)	−0.586 (0.784)	0.712 (0.487)
V Indifferent owners	12	−1.005 (0.784)	−0.820 (0.515)	−0.693 (0.497)
F value ($df = 1,680$)		660.4	843.7	376.5
P value		<0.000	<0.000	<0.000

Grouping Based on Owners' Objectives

Forest owners' objectives for forest ownership were queried with a 22-item statement set using a 5-point Likert scale. The statements related to 6 themes: recreation and leisure, timber growing and timber sales income, forest nature and landscape, economic security, emotional values of forests and forests as an object of investment. Simple data imputation (Allison 2001) was executed by substituting missing values with the value 3 ("cannot tell") in all cases in which fewer than 5 items out of 22 were missing. Consequently, the effective number of observations was 1,685.

Factor analysis with maximum likelihood extraction and varimax rotation (Lewis-Beck 1994; Anderson 2003) was performed to form combined variables describing ownership objectives for further analysis. These three factors were interpreted based on the highest loadings of the original variables on the factor as follows: *non-timber benefits*, *economic security* and *self-employment opportunities* (Appendix 1). They explained 46 % of the total variance.

The respective factor scores and theory-based initial cluster centres were then used to cluster the owners with a k-means algorithm (without iteration) into five groups as suggested by Favada et al. (2009). Interpretations and labels for each cluster were compiled with the aid of final cluster centre information (Table 1). To present the unbiased forest owner distributions in the groups, case weights were applied.

Grouping Based on Owners' Decision-Making Style

Owners' style of decision-making was queried with a 14-item set of statements and a 5-point Likert scale with an additional "cannot tell" option. The statements, originally composed and chosen from among a wider list of candidate statements in Hujala et al. (2009), related to learning-oriented communication, trusting forestry professionals and self-reliant decision-making as suggested by Hujala et al. (2007a). Where fewer than 4 items out of 14 were lacking, data imputation was used to

Table 2 Grouping based on owners' decision-making style; k-means clustering (n = 1,529)

Group	Weighted %	Mean of factor score (standard deviation)		
		Learning	Trusting	Decisiveness
1 Studious learners	37	0.558 (0.498)	0.160 (0.606)	−0.647 (0.459)
2 Deliberate thinkers	24	0.336 (0.640)	0.289 (0.570)	0.889 (0.559)
3 Delegators	20	−0.904 (0.649)	0.578 (0.585)	−0.316 (0.605)
4 Self-reliant owners	19	−0.538 (0.946)	−1.287 (0.695)	0.454 (0.705)
F value ($df = 1,527$)		414.3	557.0	646.6
P value		<0.000	<0.000	<0.000

substitute non-responses or "I can't say" responses with a value of 3. The effective number of observations was 1,529.

As above, factor analysis was executed. The total variance explained in the analysis was 55 %, and the three factors were labelled as *learning*, *trusting* and *decisiveness* based on the highest loadings (Appendix 2, see also Hujala et al. 2009). In this case the k-means clustering of observations was performed without cluster seeds, because there were no theory-based assumptions of potential clusters. A four-cluster solution proved to be interpretable (see also Kurttila et al. 2010) and the groups were given descriptive labels (Table 2). As above, case weights were applied to derive unbiased estimates for the shares of owners.

Analysis of Background Variables

Via cross-tabulating the above two groupings, the four largest combined groups were selected for further analysis. A set of background variables was used to study the differences between these groups. The background variables consisted of holding size as well as categorical and continuous variables characterizing the owner's age, gender, dwelling place, absenteeism and socioeconomic position. In addition, the background characteristics included information about timber sales, self-activity in forest work, possession of a forest plan and owners' willingness to pay for forest planning services. Pearson Chi-square test and ANOVA were applied. As the main purpose of this study was to illustrate the approach of combining different typologies, this paper only reports whether there are any significant differences between groups according to each variable, thus addressing a potential viewpoint for further analysis.

Results

Groupings

In the ownership-objective typology (Table 1), multiobjective owners with relatively high scores on all factors were the largest group with a share of 31 %.

Recreationists (22 %) seek non-timber benefits, investors (18 %) desire economic security and self-employed owners (17 %) value self-employment opportunities i.e. working in their forest. Indifferent owners (12 %) show negative scores on all factors and thus no clear pattern of objectives.

In the decision-making style typology (Table 2), studious learners constitute the largest group with a share of 37 %; they are above all eager to learn and not at all self-reliant decision-makers, thus needing external educative support. Deliberate thinkers (24 %) are highly decisive but they also show intermediate learning and trusting attitudes: they tend to combine their own view with professional opinions and other available data. Delegators (20 %) have a high score on the trusting factor but clearly negative scores on the learning and decisiveness factors: they trust experts and are not keen on learning. Self-reliant owners (19 %) show a relatively high score on the decisiveness factor and clearly negative scores on learning and trusting (professionals): they trust above all their own experiences in decision-making regarding their forest.

Combined Groups

The above groupings were cross-tabulated to explore the associations between owners' objectives and their decision-making styles (Table 3). The total number of observations with valid group membership information for both groupings was 1,457.

The largest combined group comprised 13 % of owners: those who are simultaneously classified as multiobjective owners and studious learners. This segment of owners logically reflects a curious interest in combining different uses of forests. These owners represent a multifaceted view on forest-related issues and would be prone to participate in adult educational activities.

Every tenth owner (9 %) belonged to a segment that combines multiobjective owners and deliberate thinkers. This segment is apparently rather advanced in forest-related matters: experienced but still ready to listen to advice and ponder different perspectives and decision alternatives. Obviously this segment is keen on economic calculations and calculative comparison of alternatives. Almost as many owners (8 %) could be assigned to the group of recreationists and studious learners. These owners emphasize the provision of non-timber benefits from their forests. The fourth largest group (7 %) was a combined category of investors and studious learners. They are eager to learn more about the economic value and conditions of their forests.

It is noteworthy that the indifferent owners were rather often (35 %) located in the studious learners' group. On the other hand, almost one-third (30 %) of the indifferent owners were located in the delegators' group, implying that they would be willing to give the decision power to a forestry expert. Delegators, in turn, were in general distributed rather evenly across the 5 ownership-objective groups (range 16–23 %), although few of them (13 %) were among the multiobjective owners.

Self-employed owners were distributed rather evenly across the decision-making groups. Self-reliant owners, in turn, are typically multi-objective owners, self-employed owners or recreationists (75 % altogether). These owners may appreciate

Table 3 Cross-tabulation of the two groupings (n = 1,457)

Decision-making group		Ownership-objective group					Total
		Multi-objective owners	Recreationists	Investors	Self-employed owners	Indifferent owners	
Studious learners	Row %	36	22	18	13	10	100
	Column %	42	36	38	28	35	37
	Total %	13	8	7	5	4	37
Deliberate thinkers	Row %	38	23	18	14	7	100
	Column %	29	24	24	20	15	24
	Total %	9	5	4	3	2	24
Delegators	Row %	21	23	21	20	16	100
	Column %	13	21	24	23	30	20
	Total %	4	5	4	4	3	20
Self-reliant owners	Row %	26	23	14	26	11	100
	Column %	16	19	15	29	20	19
	Total %	5	4	3	5	2	19
Total	Row %	32	23	18	17	11	100
	Column %	100	100	100	100	100	100
	Total %	32	23	18	17	11	100

The first number (underlined) in each cell shows how the forest owners in the respective decision-making group are scattered throughout the ownership-objective groups; the second number (in italics) shows how the owners in the respective ownership-objective group are distributed across the decision-making groups; and the third number (bold) shows the percentage of owners in each cell. The four largest combined groups, larger than 5 % of the total number of owners, are highlighted and especially discussed in the text

above all comparative information on their forests but may hardly be interested in communicative decision aid services.

The four largest groups (highlighted in Table 3) and the remaining owners were described by background variables (Table 4). For simplicity, the combined groups were labelled accordingly as multiobjective learners, multiobjective thinkers, learning recreationists and learning investors.

Table 4 shows that learning recreationists have the smallest forest holdings (24 hectares on average), while multiobjective learners and multiobjective thinkers have the largest, with on average no less than double that size. However, multiobjective learners and multiobjective thinkers differ with respect to the owner's age: the former group has the lowest mean age (55 years) and the latter group the highest (61 years). Learning recreationists clearly have the highest share of females, 42 %, while their share in the other groups varies between 16 and 28 %. The male dominance is greatest among the multiobjective thinkers. This group also has the highest share of rural dwellers (67 %) and the lowest share of absentee owners (25 %). The lowest share of rural dwellers (26 %) is found among learning recreationists, while the peak proportions of city dwellers (24 %) and absentee owners (60 %) appear among learning investors.

Table 4 further reveals that the share of farmers among the learning recreationists is only 3 %, while approximately one-fifth to one-quarter of the owners (18–27 %) are farmers in other groups. There are, however, many salaried employees and retirees in all the groups, the highest share of salaried employees being among the learning recreationists (46 %). The highest shares of retirees are among the

Table 4 The combined groups by owner and holding characteristics and some behavioural patterns (n = 1,457)

Group variable	Multiobjective learners 13 %	Multiobjective thinkers 9 %	Learning recreationists 8 %	Learning investors 7 %	Other owners 63 %
Forest area (ha, mean)***	57	48	24	40	33
Owner's age (years, mean)**	55	61	60	58	57
Gender (%)***					
Male	79	84	58	72	81
Female	21	16	42	28	19
Dwelling[a] (%)***					
Rural	63	67	26	39	56
Small town	16	17	26	18	18
Large town	13	11	27	20	16
City	8	4	20	24	10
Absentee (%)***	28	25	47	60	33
Socioeconomic position (%)***					
Salaried	34	26	46	30	37
Farmer	27	22	3	18	17
Entrepreneur	7	5	4	12	7
Retiree	30	46	44	40	37
Other	3	2	3	0	2
Sold timber[b]					
Sellers (%)	66	64	51	61	57
Volume (m³/ha/a, mean)*	6.3	4.4	3.9	5.5	3.9
Self-employed[c] (%)	62	61	53	49	58
Forest plan[d] (%)***	67	48	55	64	43
Willingness to pay for service[e] (%)***	80	52	63	71	49

Statistical significance levels indicated as follows: * ≤0.05; ** ≤0.01; *** ≤0.001

The table only shows whether there were significant differences between groups for each of the characteristics according to Chi-square test and ANOVA

[a] Small town = fewer than 20,000 inhabitants; large town = 20,000–100,000 inhabitants; city = >100,000 inhabitants; absentee owner = lives outside the municipality where the holding is located

[b] The share of owners who had conducted timber sales during the past 5 years, and the average timber volume sold per year

[c] The share of owners who had conducted young stand management, planting or pruning using the family labour force during the past 5 years

[d] The percentage of owners who have a valid forest plan, i.e. a maximum 10-year-old plan

[e] The respondents were asked whether they would be willing to pay for additional forest planning services (e.g. a forest walk with an expert, calculations of economic profit, guidance in using the forest plan, etc.) after receiving a forest fact sheet of information on their holding free of charge

multiobjective thinkers and learning recreationists: 46 and 44 % respectively. The highest share of timber sellers during the past 5-year period (66 %) and the highest volume sold (6.3 m^3/ha/a) are found among the multiobjective learners, who also seem to be the most active group with respect to having a forest plan (67 %) and willingness to pay for services (80 %). Learning recreationists, in turn, are the least active in selling timber (51 %, 3.9 m^3/ha/a). Learning investors have the lowest share of self-activity (49 %) but sell a rather large amount of timber (5.5 m^3/ha/a) and show in general willingness to pay for services (71 %). Multiobjective learners and multiobjective thinkers are equally active in self-active work (62 and 61 %, respectively), but multiobjective thinkers sell significantly less timber than multiobjective learners, and they also have the lowest share of forest plans (48 %) and willingness to pay for forest planning services (52 %).

Discussion

Service Perspective on the Combined Groups

The presented cross-tabulation aims to offer insights for those who design forest planners' interactions with family forest owners and/or new decision support services for owners. It may also assist in marketing communications by giving directions on what recreationists or investors, for example, would prefer to receive from services. However, the actual demand for specific services should be studied separately in each context with more precise information about the service and its price. It is important to stress that the four largest combined groups described above represent no more than 37 % of owners. Nevertheless, it is assumed that the basic lines of service provision can be meaningfully drawn with the largest groups, and the remaining two-thirds of owners would probably find the most tempting service among the more clearly presented alternatives.

The presented hypotheses were partly supported by the results. Both multiobjective owners and recreationists particularly showed learning motives. Unexpectedly, investors showed learning motives more often than self-reliant motives or deliberate thinking. Self-employed owners showed self-reliant motives a little more frequently than learning motives. It was also slightly surprising that 35 % of indifferent owners were studious learners, although 30 % of them were delegators, which partly supports the third hypothesis. This suggests that indifference may not always mean low interest but uncertainty about alternatives and a related desire to learn. These owners may be interested in receiving information that would help them to identify their latent motives and/or construe their more concrete objectives.

The fact that delegators were rather evenly distributed across the ownership-objective groups implies a potential demand for differentiated delegated services according to the owners' objectives. In the same way, the relatively even distribution of self-employed owners within the decision-making groups implies that self-employed owners occupy various decision-making strategies and thus need to be served with dialogic and calculative interactive services as well as ready-made information packages.

The mean age of learning recreationists is the second highest among the four groups. In addition, the share of females is higher and the mean holding size smaller than in other groups. Also, the share of absentee owners is high among the learning recreationists. The share of owners with these demographics will probably increase in Finland (Karppinen and Ahlberg 2008). In addition, learning recreationists are less active than most of the forest owners concerning timber sales and self-active forest management. Learning opportunities would be important for absentee forest owners. The development of planning services for this group is challenging in many ways. The development of, for example, silvicultural options, small-scale forest management and working methods that pay attention to recreational aspects has not yet been considered seriously. These developments can relate to multiple-use aspects of forests but also to considering forest-related work as a hobby. The relatively low self-activity rate and relatively high willingness to pay for services among learning recreationists and learning investors suggest that the development of planning services is needed in order to serve these groups and particularly absentee owners (e.g. Eyvindson et al. 2011).

According to Kurttila et al. (2010), nearly half of the Finnish forest owners who currently own a valid forest plan can be found in the studious learners' group. In addition, half of the owners who are willing to pay for additional forest planning services after receiving a free forest fact sheet (basic forest resource information on their holding) fall within this group. As 36 % of these studious learners are multiobjective owners (Table 3), the planning services should be designed to include elements that are useful for this group. In other words, multifaceted educational services seem to have the greatest potential among Finnish forest owners. This need becomes even more evident if the assumption that forest owners are becoming alienated from forest management and from their forests is valid (e.g. Schraml 2005).

Learning-oriented decision making seems to dominate in three out of the four largest combined groups found in this study. Only in one group are multiobjective motives connected to the deliberate thinking decision-making style. These results emphasize the development of services in which individual learning is supported in practically oriented ways. Traditionally, this would mean forest walks with a planning consultant in the owner's own forest. During the trip, the consultant could justify the suggested forest management operations to the owner and provide answers to questions from the owner. In a new situation, in which the share of absentee forest owners will probably increase in all the groups, new solutions are needed. One of them could be the establishment of model forests near big cities where practical learning can take place in small-group targeted courses or peer-to-peer-based experience sharing (see Allred and Sagor 2011; Allred et al. 2011). Deliberate thinkers can also need alternatives and possibilities to examine and compare the outcomes of alternative management opportunities through either graphically or numerically presented information. In some cases, visualization techniques could also be useful.

The deliberate thinkers and delegators have for some reason not found the current forest planning system to be particularly useful. These groups show rather low willingness to pay (18 %) for additional services, and among the owners who have a valid forest plan, only 17 % are deliberate thinkers (Kurttila et al. 2010). Since

deliberate thinkers are potentially active and supportive members of forest owners' peer community and delegators are potential customers of expert services, it would be important to recognize the more specific decision-support needs of these groups. The present result only indicates that most deliberate thinkers would find either multiobjective or recreational matters important and that delegators have a fairly even distribution of topics of interest.

Summing up the Message to Policy and Service Providers

Figure 1 summarizes the results' implications regarding policy-driven and market services for family forest owners. The figure axes show a projection of the examined owner typologies; the decision-making styles are placed on the degree of delegation dimension and the ownership-objective groups are aligned on the forestry orientation dimension (the positions of the groups are approximate). The service type of interactive decision support appears in the middle, and generally it is well suited to studious learners and deliberate thinkers with any ownership objective. In the present Finnish data set, this block includes 61 % of owners (Table 3). The dark grey ovals in Fig. 1 represent features of interactive decision support that are interpreted as important optional components of a service because they fit with the presumed needs of the four largest combined groups discussed above. In addition, the relatively uniform distributions of forest ownership objectives among self-reliant owners (Table 3) imply that information packages on different forestry topics are recommended for this 19 % segment of owners. In the same way, because the distribution of ownership objectives is relatively even among delegators, it is advised that this 20 % segment of owners be served with ready-made service concepts for outsourced decision making. Further, it is advised that those indifferent owners who are studious learners or deliberate thinkers (6 %) be served with special services aiming to help them to recognize their latent motivations and goals, thus leading to more active forest ownership and various potential policy responses.

Conclusions

Combining different forest owner typologies proved to be promising: new knowledge on owners' valuations was generated. The above results help to distinguish service and communication features to which forest owners may respond; the insight gained by looking at group combinations is richer than could have been achieved by studying only one owner typology at a time. However, the present analysis is incapable of showing to what extent the observed differences between combined groups are due to each of the two underlying typologies. The main finding is that an educative, interactive decision support service for multiobjective forest ownership should be promoted above all. Following that principle, it can be outlined that optional components of such a service may include, for example, forest visits, calculative comparisons of alternatives, optimization and internet-based service components. It is also relevant to design information packages for self-reliant owners and ready-made services for delegators. It remains
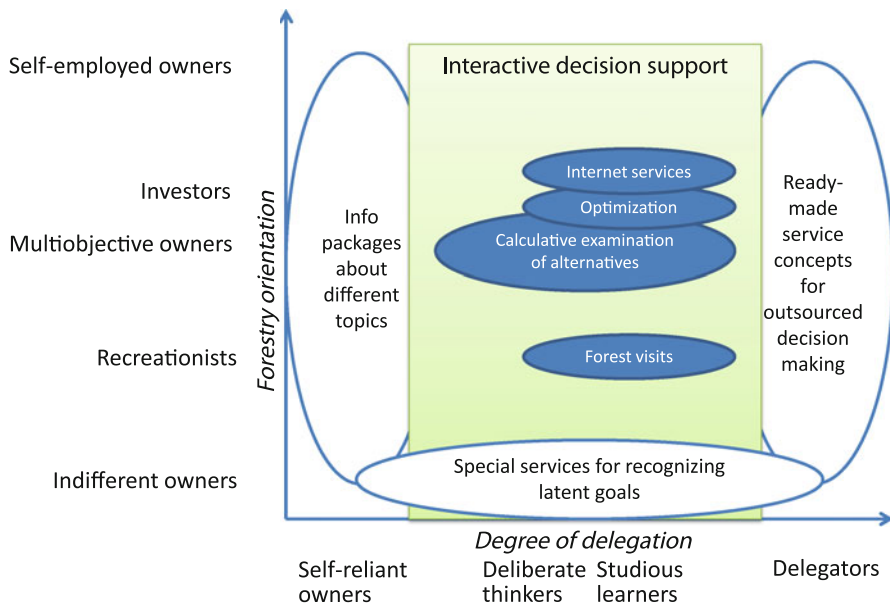
Fig. 1 Summary of the implications of the results for service provision; the features of interactive decision support in the middle represent important service contents that are interpreted relevant to the four largest combined forest owner groups

to be seen how the marketization and outsourcing of forest work (Westermayer 2006; Ní Dhubháin et al. 2007) progress and alter the motives and service needs of investors and indifferent and self-employed owners.

The results are applicable in the Finnish context where the forest planning services and guidance offered to forest owners are developed in such a direction as to meet the values and decision-making styles of owners better. However, the results only show the potential main avenues for service development. The user feedback from truly functional services needs to be tested in practical use situations with forest owners and the true willingness to pay for services needs to be examined. In addition, to make the present findings operational, further efforts should link the observed motivations of combined owner groups with concrete and actual forestry-related decision-making situations (e.g. energy wood harvesting and trading, young stand management, continuous cover forestry) and with preferred types of delivery (e.g. Toivonen et al. 2005). Alongside identifying prevalent ways and means to serve different owner groups with interactive decision-support services, it is however reasonable to maintain and develop passive mass media and internet information channels. In other words, forest owners should be given opportunities to learn from multiple channels.

The approach of combining forest owner typologies could also be used to conjoin owners' objectives and decision-making styles with owners' lifestyle-based typology (see Ziegenspeck et al. 2004). Further analysis could assess the present customer segments from the viewpoint of membership in forest owners' organization (e.g. Rickenbach et al. 2006). These analyses could reveal opportunities for

target marketing of particular services, for example, to members of forest owners' clubs or semi-urban (cottage-owner) landowners (see Hujala and Tikkanen 2008). Another continuation step would be to study landowner groups together with knowledge levels (regarding e.g. biodiversity or energy wood matters) and devise service entities with appropriate depth of content.

In addition to the empirical co-assessment of different forest owner typologies, more profound analytical assessment would also be beneficial. It is obvious that no single typology will ever serve all the various and emerging purposes in different contexts, and even if they serve policy and service providers in a usable way, owner typologies are only mental models that advise on the areas to which attention should be directed in co-configuration activity.

In the world of globalizing societal phenomena, i.e. changing family forest ownership and operational environments, there is a reason to approach a more unified framework in landowner profiling (see also Emtage et al. 2007). General linkages between owners' values, objectives, lifestyles, service needs and behaviours could be found by cross-national research efforts (see an earlier Nordic example by Nordfjell et al. 2005). At best, these steps would show a way towards a pan-European or cross-Atlantic forest owner survey system or international panel barometer, which would, in turn, guide and support contextually grounded studies in various family-forest-dominated countries.

Appendix 1

See Table 5.

Table 5 Rotated factor loadings for statements concerning objectives of forest ownership; forest planning subsample of the Finnish Forest Owner 2010 study (n = 1,685)

Sense of statement	Non-timber benefits	Economic security	Self-employment opportunities
Aesthetic value	**0.772**		
Biodiversity	**0.726**		
Solitude and meditation	**0.724**		
Outdoor recreation	**0.665**		0.361
Nature conservation	**0.646**		
Residential or leisure environment	**0.637**		0.354
Berries and mushrooms	**0.600**		0.365
Connection to home region	**0.534**		
Intrinsic value	**0.507**	0.302	
Forest work	0.417		0.412
Security for old age		**0.817**	
Provision for emergency		**0.808**	

Table 5 continued

Sense of statement	Non-timber benefits	Economic security	Self-employment opportunities
Hedging motives		**0.715**	
Creditworthiness		**0.646**	
Asset motive		**0.593**	
Funding for investments		**0.588**	0.439
Inheritance		**0.522**	
Speculative motives		0.369	
Labour income and employment		0.409	**0.568**
Regular income for consumption		**0.504**	**0.519**
Household timber	0.330		0.480
Hunting			0.311
Eigenvalue	4.341	4.087	1.897
% of variance explained	19.7	18.6	8.6

Maximum likelihood estimation, varimax rotation, loadings under 0.300 suppressed and above 0.500 in bold

Appendix 2

See Table 6.

Table 6 Rotated factor loadings for statements concerning decision-making style; forest planning subsample of the Finnish Forest Owner 2010 study (n = 1,529)

Sense of statement	Learning	Trusting	Decisiveness
I would like to know my forests better	**0.734**		
I want to understand forestry basics better	**0.703**		
More knowledge of forestry to be able to apply it	**0.697**		
I'm interested in getting knowledge on my forests	**0.680**		
Guiding information to support my decision making	**0.627**	0.372	
An expert knows best		**0.779**	
I strongly trust an expert		**0.755**	
I usually decide according to expert advice	0.363	**0.620**	
Expert advice helps me to spare time in forestry		**0.589**	
I find it important to know an expert's advice	0.488	0.496	−0.301
I decide according to my own experience		−0.326	**0.723**
I usually decide without letting advice affect me			**0.655**
I already know enough			**0.591**
Guiding information is useless for me			**0.528**

Table 6 continued

Sense of statement	Learning	Trusting	Decisiveness
Eigenvalue	3.042	2.623	2.078
% of variance explained	21.7	18.7	14.8

Maximum likelihood estimation, varimax rotation, loadings under 0.300 suppressed and above 0.500 in bold

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